Cisco uBR7246 Universal Broadband Router Feature Enhancements

Feature Summary

The enhancements to the Cisco uBR7246 cable router extend and improve the command line interface (CLI). They support burst profile, quality of service (QoS), improved parameter configuration, the MC11 modem card, and the MC16 modem card.

Downstream QoS handling is compliant with Multimedia Cable Network System (MCNS) requirements, and upstream QoS handling and Spectrum Management have been improved.

The Cisco uBR7246 now supports multicast authentication via RADIUS, and security has been enhanced for baseline privacy, including MCNS Data Over Cable System Interface Specification (DOCSIS) compliance. Also, this cable router now supports Dynamic Host Configuration Protocol (DHCP) Relay Subscriber ID Insertion.

Benefits

These enhancements to the Cisco uBR7246 cable router bring value to the digital broadband network by:

- Supporting burst profile configuration.

- Allowing QoS configuration including downstream QoS handling that is compliant with MCNS requirements and improved upstream QoS handling.

- Enhancing security for baseline privacy.

Supported Platforms

This feature is supported on the Cisco uBR7246 router only.

Prerequisites

Before configuring the feature enhancements, complete the basic configuration of the Cisco uBR7246 as described in the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

Supported MIBs and RFC

The Cisco uBR7246 feature enhancements support the Radio Frequency (RF) Interface Management Information Base (MIB). For descriptions of supported MIBs and how to use MIBs, see Cisco's MIB website on Cisco Connection Online (CCO) at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

No RFCs are supported by this feature.

List of Terms and Acronyms

Amplifier—Used on coaxial segments of a Community Antenna Television (CATV) plant to restore signal levels lost due to attenuation through distance. Unfortunately, amplifiers amplify noise as well as signal.

Branch Line—A coaxial cable that runs from a trunk line to a subscriber drop point. A branch line is also known as "Feeder Cable."

Cable Modem—Any device that modulates and demodulates digital data onto a CATV plant.

Cable Line Card—Modem front-end card of the cable router headend unit, plugged into the midplane. Each Cable Line Card provides a number of radio frequency (RF) channels as external interfaces.

Cable Router—A modular chassis-based router optimized for the data-over-CATV hybrid fiber-coaxial (HFC) application.

CATV—Originally Community Antenna Television. Now used to refer to any cable-based (coaxial/fiber) system provision of television services.

CDM—Cable Data Modem.

CDMTS, **CMTS**—Cable (Data) Modem Termination System.

Channel—A specific frequency allocation and bandwidth. Downstream channels used for television in the US are 6 MHz wide. In Europe, downstream channel width is 8 MHz.

CLI—Command line interface.

Combiner Group—The return paths of several fiber nodes can be combined at a single point to form one RF domain. This single point is called a combiner group. See also Spectrum Group.

CPE—Customer Premises Equipment. In the Cable Router application, this will usually be one or multiple PCs located at the customer side.

Distribution Hub—A smaller or remote headend distribution point for a CATV system. Video signals are received here from another site (headend), and redistributed. Sometimes a small number of locally originated signals are added. Such signals can be city information channels, HFC cable modem signals, and so forth.

Downstream—Set of frequencies used to send data from a headend to a subscriber.

Drop—A subscriber access point. The actual coaxial connection in the subscriber's home.

Fiber Node, Node—An optical node located in the outside plant distribution system which terminates the fiber-based downstream signal as an electrical signal onto a coaxial RF cable. Each fiber node is defined to support a certain serving area, either defined by number of homes passed or total amplifier cascade (number of active amplifiers in the longest line from the node to the end of the line).

Headend—Central distribution point for a CATV system. Video signals are received here from satellite (either co-located or remote), and the frequency is converted to the appropriate channels. Channels are then combined with locally originated signals, and rebroadcast onto the hybrid fiber-coaxial (HFC) plant. For a CATV data system, the headend is the typical place to link the HFC system and any external data networks.

HFC—Hybrid fiber-coaxial. Older CATV systems were provisioned using only coaxial cable. Modern systems use fiber transport from the headend to an optical node located in the neighborhood to reduce system noise. Coaxial cable runs from the node to the subscriber. The fiber plant is generally a star configuration with all optical node fibers terminating at a headend. The coaxial cable part of the system is generally a trunk and branch configuration.

Homes Passed—Number of homes or offices potentially serviceable by a cable system either on a per node or per system basis.

Midsplit—A frequency allocation plan where 5 to 108 MHz is used for upstream data and 178+ MHz is used for downstream data.

Optical Node—A device used to convert broadband RF (for example, television signals) to and from a fiber optic signal. An optical node is typically located in the outside field.

Predator—Code name for the Cisco 7200 class of modular routers that accept PCI bus-based port adapters.

QAM—Modulation scheme mostly used in the downstream direction (QAM-64, QAM-256). QAM-16 is expected to be usable in the upstream direction. Numbers indicate number of code points per symbol. Number of bits per symbol can be computed by $2^{(\text{number of bits/symbol})} = $ number of code points.

QPSK—Modulation scheme used in the upstream direction. Supports two data bits per symbol.

Spectrum Group—A combiner group can be associated with a frequency hop table. This frequency hop table associated with a combiner group is the spectrum group, as opposed to the RF topology point, which is the combiner group. See also Combiner Group.

Subsplit—A frequency allocation plan where 0 to 42 MHz is used for upstream data and 50+ MHz is used for downstream data.

Tap—A passive device that divides the signal between the trunk or feeder lines and splits the signal into ports for subscriber drop access.

Telephony Return—A variant of a cable data system where the return path from the subscriber cable modem is routed over a dialup (or ISDN) connection instead of over an upstream channel.

Trunk Line—A CATV backbone coaxial cable. This runs from an Optical Node and through a specific neighborhood or serving area.

Upstream—The set of frequencies used to send data from a subscriber to the headend.

Configuration Tasks

The basic configuration tasks required by this version of the Cisco uBR7246 cable router are the same as those described in the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

Additional configuration tasks are:

- Configuring Spectrum Groups (Optional)
- Configuring Frequency Hopping (Optional)

Configuring Spectrum Groups

You can configure upstream frequency hop tables using **cable spectrum-group** commands. Start by determining which upstream ports are assigned to a combiner group. Then apply the following steps to configure a spectrum group:

Step	Command	Purpose
1	router(config)# **cable spectrum-group** n **frequency** y	Create the frequency hop table under Cisco IOS global configuration mode.
2	router(config-if)# **cable** n **spectrum-group** y	Assign the upstream port to the frequency hop table under Cisco IOS interface configuration mode.

Configuring Frequency Hopping

To configure frequency hopping, apply the following steps:

Step	Command	Purpose
1	router(config)# **cable spectrum-group 1 frequency 20800000** router(config)# **cable spectrum-group 1 frequency 22400000** router(config)# **cable spectrum-group 1 frequency 24000000**	Configure spectrum groups.
2	router(config)# **interface c3/0**	Assign the upstream ports to the frequency hop tables for interface.
3	router(config-if)# **cable spectrum-group 1** router(config-if)# **no cable upstream 0 shutdown**	Assign members to spectrum groups, making sure that everything else has been configured correctly on the interface.
4	router(config-if)# **cable upstream 2 spectrum-group 1** router(config-if)# **no cable upstream 2 shutdown**	If you have an MC16 card, upstreams can be assigned individually.
5	router(config-if)# **exit** router# **test cable hop c3/0** router# **test cable hop c3/0**	Exit configuration mode and force the system to hop.

After you have established basic operation, inject a tone to the upstream port. For example, if the upstream frequency is currently 22.4 MHz, inject a 22.4 MHz tone at approximately the same power level as the modem. (If the power level at the modem is 40 dBmV, set the tone power to 40 dBmV.) The interfering carrier should shut down the channel and cause the frequency to change to the next configured value. In this example, it would be 24.0 MHz.

If you do not have an RF tone generator, use another line card and modem that caries traffic. Connect the upstream to the same combiner group, and use the data carrier as an interfering signal by setting it to the same frequency. For example, to test frequency hopping on c3/0, install c4/0 and connect both upstreams together using a combiner. If the upstream frequency of c3/0 is currently 22.4 Mhz, set c4/0 to 22.4 Mhz while c4/0 is carrying traffic. This should force c3/0 to change the frequency to the next configured value.

Verifying

The verification tasks required by this version of the Cisco uBR7246 cable router are the same as those described in the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

Note the following:

*   The controller must report being up.

*   The comparison of the number of errors versus the number of error-free packets is a measure of the link quality. The percentage of errors should be less than 1%.

Configuration Examples

To illustrate configuring spectrum groups, assume that an MC16 card is in slot 3 and is named cable3/0. Its upstream ports are named U0 through U5. You want ports U0 through U3 to belong to one combiner group, and ports U4 and U5 to belong to a different combiner group because of higher subscriber penetration. In both combiner groups, the allocated spectrum should be three 3.2 MHz slots centered at 21.6, 24.8, and 28.0 MHz. The allocated spectrum is 20.0 to 29.6 MHz. From global configuration mode, enter the **configure terminal** command. Then enter:

```
router(config)# cable spectrum-group 1 frequency 21600000
router(config)# cable spectrum-group 1 frequency 24800000
router(config)# cable spectrum-group 1 frequency 28000000

router(config)# cable spectrum-group 2 shared
router(config)# cable spectrum-group 2 frequency 21600000
router(config)# cable spectrum-group 2 frequency 24800000
router(config)# cable spectrum-group 2 frequency 28000000
```

Spectrum group 1 will be used for ports U0 through U3. Spectrum group 2 will be used for ports U4 and U5. Because ports U4 and U5 belong to the same combiner group, spectrum group 2 is configured as shared. The **shared** keyword prevents frequency collision.

To assign the upstream ports to the frequency hop tables for slot 3, enter:

```
router(config)# interface Cable3/0
```

Then enter:

```
router(config-if)# cable u0 spectrum-group 1
router(config-if)# cable u1 spectrum-group 1
router(config-if)# cable u2 spectrum-group 1
router(config-if)# cable u3 spectrum-group 1
router(config-if)# cable u4 spectrum-group 2
router(config-if)# cable u5 spectrum-group 2
```

The upstream ports are assigned frequencies from their respective spectrum groups. Ports U0 through U3 will be set to 21.6 MHz. Ports U4 and U5 will be set to 21.6 and 24.8 MHz, respectively.

For additional configuration examples, refer to the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 11.3 command references.

- **cable downstream modulation**
- **cable downstream rate-limit**
- **cable flap-list aging**
- **cable flap-list insertion-time**
- **cable flap-list power-adjust threshold**
- **cable flap-list size**
- **cable helper-address**
- **cable insertion-interval**
- **cable match address**
- **cable modulation-profile**
- **cable privacy**
- **cable qos permission**
- **cable qos profile**
- **cable relay-agent-option**
- **cable shared-secret**
- **cable spectrum-group band**
- **cable spectrum-group frequency**
- **cable spectrum-group hop period**
- **cable spectrum-group hop threshold**
- **cable spectrum-group shared**
- **cable upstream admission-control**
- **cable upstream channel-width**
- **cable upstream data-backoff**
- **cable upstream minislot-size**
- **cable upstream modulation-profile**
- **cable upstream range-backoff**
- **cable upstream rate-limit**
- **clear cable flap-list**
- **clear cable modem counters**
- **clear cable modem reset**
- **ping cable-modem**
- **show cable flap-list**
- **show cable modem**

- **show cable modulation-profile**
- **show cable qos permission**
- **show cable qos profile**
- **show cable spectrum-group**
- **show controllers cable**
- **show interface cable**
- **show interface cable sid**
- **show interface cable signal-quality**
- **test cable atp cable**

cable downstream modulation

To set the modulation rate for a downstream port on a cable modem card, use the **cable downstream modulation** cable interface configuration command:

cable downstream modulation {**64qam** | **256qam**}

Syntax Description

64qam	Modulation is 6 bits per downstream symbol rate.
256qam	Modulation is 8 bits per downstream symbol rate.

Default

64qam

Command Mode

Cable interface configuration

Command History

Release	Modification
11.3 XA	This command was first introduced.

Usage Guidelines

Downstream modulation defines the modulation type used for downstream traffic. Specifying the symbol rate indirectly influences the interface speed; at 64qam, the interface speed is 6xx bits/second. Specifying 256qam sets the interface speed to 8xx bits/second.

Example

The following example sets the downstream modulation:

```
Router(config)# interface cable 6/0
Router(config-if)# cable downstream modulation 256qam
```

cable downstream rate-limit

To enable Data Over Cable Services Interface Specification (DOCSIS) rate limiting on downstream traffic, use the **cable downstream rate-limit** interface configuration command. Use the **no** form of this command to disable DOCSIS rate-limiting on downstream traffic.

cable downstream rate-limit [**token-bucket | weighted-discard**] [*exp-weight*]
no cable downstream rate-limit

Syntax Description

token-bucket	(Optional) Specifies the token bucket filter algorithm.
weighted-discard	(Optional) Specifies the weighted discard algorithm.
exp-weight	(Optional) Specifies the weight for the exponential moving average of loss rate. Valid values are from 1 to 4.

Default

cable downstream rate-limit, which enforces strict DOCSIS-complaint rate limiting.

Command Mode

Interface configuration

Command History

Release	Modification
11.3(6)NA	This command was first introduced.

Usage Guidelines

When you enter this command without an option, it enables strict DOCSIS-compliant rate limiting, which sets the burst rate to the interface speed.

Example

The following example applies the token bucket filter algorithm:

```
Router(config-if)# cable downstream rate-limit token-bucket
```

Related Commands

Command	Description
cable upstream rate-limit	Sets the DOCSIS rate limit for an upstream port.

cable flap-list aging

To specify the number of days to age the cable modem from the flap-list table, use the **cable flap-list aging** global configuration command. Use the **no** form of this command to disable this feature.

> **cable flap-list aging** *number of days*
> **no cable flap-list aging**

Syntax Description

number of days	Specifies how many days of cable modem performance is retained in the flap list. Valid values are from 1 to 60.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

A flap list is a table maintained by the Cisco uBR7246 for every modem (active or not) that is having communication difficulties. The cable flap list tracks the cable modem MAC address up and down transitions, registration events, missed periodic ranging packets, upstream power adjustments, and the CMTS physical interface. (Flapping refers to the rapid disconnecting and reconnecting of a cable modem that is having problems holding a connection.) The flap list contains modem MAC addresses and logs the time of the most recent activity. You can configure the size and entry thresholds for the flap list.

Example

The following example specifies that the flap-list table retain two days of performance for this cable modem:

```
Router(config)# cable flap-list aging 2
```

Related Commands

Command	Description
cable flap-list insertion-time	Sets the insertion time interval.
cable flap-list power-adjust threshold	Specifies the power-adjustment threshold for recording a flap-list event.

cable flap-list size	Specifies the maximum number of modems that can be reported to the flap-list table.
clear cable flap-list	Resets the flap-list table.

cable flap-list insertion-time

To set the insertion time interval, use the **cable flap-list insertion-time** global configuration command. Use the **no** form of this command to disable insertion time.

> **cable flap-list insertion-time** *seconds*
> **no cable flap-list insertion-time**

Syntax Description

seconds	Insertion time interval in seconds. Valid values are from 60 to 86400.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

This command controls the operation of a flapping modem detector. When the link establishment rate of a modem is shorter than the period defined by this command, the modem is placed in the flap list.

Example

The following example sets the insertion time interval to 62 seconds:

```
Router(config)# cable flap-list insertion-time 62
```

Related Commands

Command	Description
cable flap-list aging	Specifies when a modem's entry in the flap-list table will be deleted.
cable flap-list power-adjust threshold	Specifies the power-adjustment threshold for recording a flap-list event.
cable flap-list size	Specifies the maximum number of modems that can be reported to the flap-list table.
clear cable flap-list	Resets the flap-list table.

cable flap-list power-adjust threshold

To specify the power-adjust threshold for recording a flap-list event, use the **cable flap-list power-adjust threshold** global configuration command. Use the **no** form of this command to disable power-adjust thresholds.

cable flap-list power-adjust threshold *dBmV*
no cable flap-list power-adjust threshold

Syntax Description

dBmV	Decibels per millivolt. Valid values are from 1 to 10.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

This command controls the operation of a flapping modem detector. When the power adjustment of a modem exceeds the threshold, the modem is placed in the flap list.

Example

The following example shows the power-adjust threshold to 1:

```
Router(config)# cable flap-list power-adjust threshold 1
```

Related Commands

Command	Description
cable flap-list aging	Specifies when a modem's entry in the flap-list table will be deleted.
cable flap-list insertion-time	Sets the insertion time interval.
cable flap-list size	Specifies the maximum number of modems that can be reported to the flap-list table.
clear cable flap-list	Resets the flap-list table.

cable flap-list size

To specify the maximum number of modems reported in the flap-list table, use the **cable flap-list size** global configuration command. Use the **no** form of this command to specify the default flap-list table size.

> **cable flap-list size** *number*
> **no cable flap-list size**

Syntax Description

number	Specifies the number of modems that report flap performance to the flap-list table. Valid values are from 1 to 8191.

Default

The default cable flap-list size is 8192.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example limits the flap-list table size to no more than 2 modems:

```
Router(config)# cable flap-list size 2
```

Related Commands

Command	Description
cable flap-list aging	Specifies when a modem's entry in the flap-list table will be deleted.
cable flap-list insertion-time	Sets the insertion time interval.
cable flap-list power-adjust threshold	Specifies the power-adjustment threshold for recording a flap-list event.
clear cable flap-list	Resets the flap-list table.

cable helper-address

To specify a destination address for User Datagram Protocol (UDP) broadcast (DHCP) packets, use the **cable helper-address** interface configuration command. Use the **no** form of this command to disable this feature.

cable helper-address *IP-address* {**cable-modem** / **host**}
no cable helper-address *IP-address* {**cable-modem** / **host**}

Syntax Description

IP-address	The IP address of a DHCP server.
cable-modem	Specifies that only cable modem UDP broadcasts are forwarded.
host	Specifies that only host UDP broadcasts are forwarded.

Default

No default behavior or values.

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

If you specify a secondary interface address, the giaddr field in the DHCP requests will be sent to the primary address for DHCP requests received from cable modems, and to the secondary IP address for DHCP requests received from hosts.

Examples

The following example forwards UDP broadcasts from cable modems to the DHCP server at 172.23.66.44:

```
Router(config-if)# cable helper-address 172.23.66.44 cable-modem
```

The following example forwards UDP broadcasts from hosts to the DHCP server at 172.23.66.44:

```
Router(config-if)# cable helper-address 172.23.66.44 host
```

cable insertion-interval

To set the time between opportunities for cable modems to request a connection from the Cisco uBR7246, use the **cable insertion-interval** interface configuration command. Use the **no** form of this command to use the automatic setting and ignore any minimum or maximum time settings.

> **cable insertion-interval** [**automatic**] [*min* | *max*]
> **no cable insertion-interval**

Syntax Description

automatic	Causes the Cisco uBR7246 MAC scheduler for each upstream modem to vary the frequency of initial ranging slots used by new modems joining the network.
min	Minimum time in milliseconds that the cable modem termination system (CMTS) is allowed to vary the initial ranging slot time. Valid values are from 25 to 200. Default is 50 milliseconds.
max	Maximum time in milliseconds that the CMTS is allowed to vary the initial ranging slot time. Valid values are from 500 to 2000. Default is 2000 milliseconds (that is, 2 seconds).

Default

automatic (dynamically varying the frequency of initial ranging upstream slots between 50 milliseconds to 2 seconds).

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

Use this command to configure the frequency at which the initial maintenance interval is to appear in MAP messages. MAP messages define the precise time intervals during which modems can transmit.

Use the **automatic** keyword with this command when you have to bring a lot of modems on line quickly (for example, after a major power failure). Override the **automatic** keyword by specifying an insertion interval.

Example

The following example specifies the automatic setting:

```
Router(config-if)# cable insertion-interval automatic
```

Related Commands

Command	Description
cable insertion-interval	Sets the time interval that a modem must wait after a failed attempt to connect to the uBR7246.

cable match address

To specify that IP multicast streams be encrypted, use the **cable match address** interface configuration command. Use the **no** form of this command if you do not want to use encryption.

> **cable match address** *access-list*
> **no cable match address**

Syntax Description

access-list	Specifies that the IP multicast streams defined by the access list be encrypted. Access lists can be IP access list numbers or an IP access list name. Valid access list numbers are from 100 to 199.

Default

No default behavior or values.

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

Configure the access list using the **ip access-list** command.

Examples

The following example specifies that the multicast stream defined by the access list named reno be encrypted:

```
Router(config-if)# cable match address reno
```

The following example specifies that the multicast stream defined by the access list number 102 be encrypted:

```
Router(config-if)# cable match address 102
```

Related Commands

Command	Description
ip access-list	Defines an IP access list by name.

cable modulation-profile

To define the modulation profile, use the **cable modulation-profile** global configuration command. Use the **no** form of this command to remove the specified modulation profile.

cable modulation-profile *profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff pre-len last-cw uw-len*
no cable modulation-profile *profile iuc fec-tbytes fec-len burst-len guard-t mod scrambler seed diff pre-len last-cw uw-len*

Syntax Description

profile	Modulation profile number.
iuc	Interval usage code. Valid entries are: **initial**, **long**, **request**, **short**, or **station**.
fec-tbytes	The number of bytes that can be corrected per FEC code word. Valid values are from 0 to 10, where 0 means no FEC.
fec-len	FEC code word length. Valid values are from 16 to 253.
burst-len	Maximum burst length in minislots. Valid values are from 0 to 255, where 0 means no limit.
guard-t	Guard time in symbols. The time between successive bursts.
mod	Modulation. Valid entries are **16qam** and **qpsk**.
scrambler	Enable or disable scrambler. Valid entries are **scrambler** and **no-scrambler**.
seed	Scrambler seed in hexidecimal format. Valid values are from 0x0000 to 0x7FFF.
diff	Enable or disable differential encoding. Valid entries are **diff** and **no-diff**.
pre-len	Preamble length in bits. Valid values are from 2 to 128.
last-cw	Handling of FEC for last code word. Valid entries are **fixed** for fixed code word length and **shortened** for shortened last code word.
uw-len	Upstream unique word length. Enter **uw8** for 8-bit unique words or **uw16** for 16-bit unique code words.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

You can use the **no** form of this command to remove all modulation profiles except modulation profile 1. In the case of modulation profile 1, the **no** form of this command sets all of the parameters in a burst to default values.

> ⚠ **Caution** Changes to modulation profiles causes changes to the physical layer. Because changing physical layer characteristics affects router performance and function, this task should be reserved for expert users.

Example

The following example defines the burst parameters for profile 2 as follows:

The request burst is defined to have 0 fec-tbytes, 16 kbytes fec-len, a burst-len of 1, a guard time of 8, a mod value of qpsk, scrambler enabled with a seed value of 152, differential encoding disabled, a preamble length of 64 bits, a fixed code word length, and 8-bit unique words for upstream unique word length. The remaining initial, station, short, and long bursts are defined in similar fashion for profile 2.

```
Router(config)# cable modulation-profile 2 request 0 16 1 8 qpsk scrambler 152 no-diff
64 fixed uw8
Router(config)# cable modulation-profile 2 initial 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 station 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 short 6 75 6 8 16qam scrambler 152 no-diff
144 fixed uw8
Router(config)# cable modulation-profile 2 long 8 220 0 8 16qam scrambler 152 no-diff
160 fixed uw8
```

> **Note**   You have to create all of the bursts (request, initial, station, short and long) for this modulation profile to use the **modulation profile** command.

See the **show cable modulation-profile** command for a description of the output display fields.

Related Commands

Command	Description
cable upstream modulation-profile	Assigns a modulation profile to an interface.
show cable modulation-profile	Displays a modulation profile group's information.

cable privacy

To enable privacy in the system, use the **cable privacy** interface configuration command. Use the **no** form of this command to disable privacy.

> **cable privacy** [**mandatory | authenticate-modem | authorize-multicast**]
> **no cable privacy**

Syntax Description

mandatory	(Optional) Enforce Baseline Privacy for all modems.
authenticate-modem	(Optional) Use AAA protocols to authenticate all modems during BPI initialization.
authorize-multicast	(Optional) Use AAA protocols to authorize all multicast stream (IGMP) join requests.

Default

mandatory

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

While the default for this command is to enable privacy, it is not mandatory.

Examples

The following example displays the options available with this command:

```
Router(config-if)# cable privacy ?
  authenticate-modem   turn on BPI modem authentication
  authorize-multicast  turn on BPI multicast authorization
  kek                  KEK Key Parms
  mandatory            force privacy be mandatory
  tek                  TEK Key Parms
```

The following example forces Baseline Privacy to be used for all modems:

```
Router(config-if)# cable privacy mandatory
```

The following example turns on BPI modem authentication:

```
Router(config-if)# cable privacy authenticate-modem
```

The following example turns on BPI muticast authorization:

```
Router(config-if)# cable privacy authorize-multicast
```

Related Commands

Command	Description
ping cable-modem	Reports the on line status of the specified cable modem.

cable qos permission

To specify permission for updating the QoS table, use the **cable qos permission** global configuration command. Use the **no** form of this command to remove a previously enabled permission.

cable qos permission {**create-snmp** / **modems** / **update-snmp**}
no cable qos permission

Syntax Description

create-snmp	Permits creation of QoS table entries by Simple Network Management Protocol (SNMP).
modems	Permits creation of QoS table entries by modem registration requests.
update-snmp	Permits dynamic update of QoS table entries by SNMP.

Default

Enable by modem and SNMP.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example enables modems to request arbitrary QoS parameters:

```
Router(config)# cable qos permission modems
```

Related Commands

Command	Description
cable qos profile	Configures a quality of service (QoS) profile.
show cable qos permission	Displays the status of the QoS table permissions.
show cable qos profile	Displays QoS profiles.

cable qos profile

To configure a QoS profile, use the **cable qos profile** global configuration command. Use the **no** form of this command to either set default values for profile group numbers 1 or 2, or remove the QoS profile if no specific parameters remain.

> **cable qos profile** {*groupnum* | *guaranteed-upstream* | *max-burst* | *max-upstream* | *max-downstream* | *priority* | *tos-overwrite* | *value*}
> **no cable qos profile** {*groupnum* | *guaranteed-upstream* | *max-burst* | *max-downstream* | *priority* | *tos-overwrite* | *value*}

Syntax Description

groupnum	QoS profile group number. Qos profiles 1 and 2 are required by the system. QoS profile 1 is used during registration, and QoS profile 2 is the default QoS profile. Both profiles are preconfigured and cannot be removed. However, you can modify these profiles.
guaranteed-upstream	Guaranteed minimum upstream rate in kilobytes per second. Valid values are from 0 to 100000. Default value is 0 (no reserved rate).
max-burst	Maximum upstream transmit burst size in bytes that the modem can send for any single transmit burst. Valid values are from 0 to 255. Default value is 0 (no limit).
max-upstream	Maximum upstream data rate in kilobytes per second that a modem using this QoS profile will receive. Valid values are from 0 to 255. Default value is 0 (no upstream rate limit).
max-downstream	Maximum downstream data rate in kilobytes per second that a modem using this QoS profile will receive. Valid values are from 0 to 255. Default value is 0 (no downstream rate limit).
priority	Relative priority number assigned to upstream traffic by this QoS profile. Valid values are from 0 to 7, with 7 being the highest priority. Default value is 0.
tos-overwrite	Overwrite the Type of Service (TOS) field in the IP datagrams received on the upstream before forwarding them downstream (or IP backbone). This parameter sets the hexadecimal mask bits to a hexadecimal value. This helps the CMTS identify datagrams for QoS on the backbone.
value	The value substituted for the TOS value. See *tos_overwrite*.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example configures QoS profile 4 with guaranteed upstream of 2 kbps, maximum transmission burst of 2, maximum downstream rate of 3 kbps, with a priority of 4, cable baseline privacy set, and a *tos-overwrite* mask and value byte (in hex) of 0x2:

```
Router(config)# cable qos profile 4 guaranteed-upstream 2
Router(config)# cable qos profile 4 max-burst 2
Router(config)# cable qos profile 4 max-downstream 3
Router(config)# cable qos profile 4 priority 4
Router(config)# cable qos profile 4 tos-overwrite 0x2
```

Related Commands

Command	Description
cable qos permission	Configures permissions for updating the QoS table.
show cable qos profile	Displays QoS profiles.

cable relay-agent-option

To enable the system to insert the cable modem MAC address into a DHCP packet received from a modem or host and forward the packet to a DHCP server, use the **cable relay-agent-option** interface configuration command. Use the **no** form of this command to disable insertion.

> **cable relay-agent-option**
> **no cable relay-agent-option**

Syntax Description

This command has no keywords or arguments.

Default

no cable relay-agent-option

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

This functionality enables a DHCP server to identify the user (cable modem) sending the request and initiate appropriate action based on this information.

Example

The following example enables the insertion of DHCP relay agent information into DHCP packets:

```
Router(config-if)# cable relay-agent-option
```

cable shared-secret

To configure authentication and data privacy parameters, use the **cable shared-secret** interface configuration command. Use the **no** form of this command to disable authentication during the modem's registration phase.

cable shared-secret [**0** | **7**] *authentication-key*
no cable shared-secret

Syntax Description

0	(Optional) Specifies that an unencrypted message will follow.
7	(Optional) Specifies that an encrypted message will follow.
authentication-key	Text string is a shared secret string. When you enable the service password-encryption option, the password is stored in encrypted form. The text string is a 64-character authentication key.

Default

no cable shared-secret

Command Mode

Interface configuration

Command History

Release	Modification
11.3 XA	This command was first introduced.

Example

The following example activates cable modem authentication, using "3344912349988...sf" as the shared secret key and indicating that an encrypted message follows:

```
router(if-config)# cable shared-secret 7 3344912349988cisco@xapowenaspasdpuy230jhm...sf
```

cable spectrum-group band

To configure a continuous band setting for a spectrum group, use the **cable spectrum-group band** global configuration command. Use the **no** form of this command to delete the band settings for a spectrum group.

> **cable spectrum-group** *group-number* [**time day** *hh***:***mm***:***ss*] [**delete**] **band** *start-freq-hz*
> *end-freq-hz* [*power-level-dbmv*]
> **no cable spectrum-group** *group-number*

Syntax Description

group-number	Spectrum group number. Valid values are from 1 to 32.
time day *hh:mm:ss*	(Optional) For scheduled spectrum groups, makes the band setting available at the specified time in hours (hh), minutes (mm), and seconds (ss).
delete	(Optional) Removes the band setting from use at the specified time.
band	Specifies that a continuous band setting be used in this group.
start-freq-hz	Lower boundary of the frequency band.
end-freq-hz	Upper boundary of the frequency band.
power-level-dbmv	(Optional) Nominal input power level in decibels per millivolt (dBmV). Valid values are from –10 to +10. Some cable plants might want to change only the input power level and not frequency on a daily time schedule.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 XA1	This command was first introduced.

Usage Guidelines

This command specifies that a continuous band setting be used as a unit of allocated spectrum within this spectrum group. Cable plants can choose to set up a daily schedule that changes the input power level and not the frequency.

Examples

The following example specifies that all the upstream ports for spectrum-group 4 share the same spectrum from 5000004 Hz to 40000000 Hz with a power level of 5 dBmV on Mondays at noon:

```
Router(config)# cable spectrum-group 4 time Monday 12:00:00 band 5000004 40000000 5
```

The following example deletes the frequency band created in the previous example:

```
Router(config)# cable spectrum-group 4 time Monday 12:00:00 delete band 5000004
40000000 5
```

cable spectrum-group frequency

To configure a spectrum group to use a center frequency, use the **cable spectrum-group frequency** global configuration command. Use the **no** form of this command to delete the configured frequency setting for this spectrum group.

cable spectrum-group *groupnum* [**time day** *hh:mm:s***s**] [**delete**] **frequency** *freq-hz* [**dBmV**]
no cable spectrum-group *groupnum* [**time day** *hh:mm:ss*] [**delete**] **frequency** *freq-hz* [**dBmV**]

Syntax Description

groupnum	Spectrum group number. Valid values are from 1 to 32.
time day *hh:mm:ss*	(Optional) Makes the frequency setting available at the specified time in hours (hh), minutes (mm), and seconds (ss).
delete	(Optional) Removes the frequency setting from use at the specified time.
frequency	Specifies that a center frequency setting should be used in this group.
freq-hz	Upstream center frequency in Hertz. Valid values are from 5,000,000 to 42,000,000. Half of the upstream carrier energy is distributed above and half is distributed below the specified frequency.
dBmV	(Optional) Nominal input power level in decibels per millivolt (dBmV). Valid values are from –10 to +10.

Default

No default behavior or values.

Command Mode

Global configuration

Command History

Release	Modification
11.3 XA1	This command was first introduced.

Usage Guidelines

A spectrum group allows the upstream frequency and input power level to change whenever noise impairs upstream traffic.

Cable plants can choose to set up a daily schedule that changes the input power level and not the frequency.

Example

The following example configures spectrum group 4 with an upstream frequency of 5000004 Hz and a power level of 5 dBmV:

```
Router(config)# cable spectrum-group 4 frequency 5000004 5
```

cable spectrum-group hop period

To set the frequency-hop period, use the **cable spectrum-group hop period** global configuration command. Use the **no** form of this command to delete the frequency hop period for this spectrum group.

> **cable spectrum-group** *groupnum* **hop period** *seconds*
> **no cable spectrum-group** *groupnum* **hop period**

Syntax Description

groupnum	Spectrum group number. Valid values are from 1 to 32.
seconds	Specifies the frequency-hop time period in seconds. Valid values are from 1 to 3600.

Default

300 seconds

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example sets the frequency-hop period to 60 seconds:

```
Router(config)# cable spectrum-group hop period 60
```

Related Commands

Command	Description
cable spectrum-group hop threshold	Sets the hop threshold for a spectrum group.

cable spectrum-group hop threshold

To specify a hop threshold for a spectrum group, use the **cable spectrum-group hop threshold** global configuration command. Use the **no** form of this command to delete the hop threshold for this spectrum group.

cable spectrum-group *groupnum* **hop threshold** [*percent*]
no cable spectrum-group *groupnum* **hop threshold**

Syntax Description

groupnum	Spectrum group number. Valid values are from 1 to 32.
percent	(Optional) Specifies the hop threshold in percentage of capacity. Valid range of modems used is 1 to 100.

Default

100 percent

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example sets the threshold which triggers frequency hop to 20% for spectrum-group 4:

```
Router(config)# cable spectrum-group 4 hop threshold 20
```

Related Commands

Command	Description
cable spectrum-group hop period	Defines the frequency-hop period.

cable spectrum-group shared

To specify that the upstream ports share the same spectrum, use the **cable spectrum-group shared** global configuration command. Use the **no** form of this command to delete the spectrum group.

> **cable spectrum-group** *groupnum* **shared**
> **no cable spectrum-group** *groupnum* **shared**

Syntax Description

groupnum	Spectrum group number. Valid values are from 1 to 32.

Default

Upstream port frequency the same for all ports in the spectrum group.

Command Mode

Global configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

Because this command forces upstream ports to use the same spectrum, do not use this command for overlapping carriers.

Example

The following example specifies that all the upstream ports for spectrum-group 4 share the same spectrum:

```
Router(config)# cable spectrum-group 4 shared
```

cable upstream admission-control

To specify the percentage overbooking rate, use the **cable upstream admission-control** interface configuration command. Use the **no** form of this command to disable upstream admission control.

cable upstream *portnum* **admission-control** *percentage*
no cable upstream *portnum* **admission-control**

Syntax Description

portnum	Specifies the upstream port.
percentage	Specifies the percentage overbooking rate to limit overbooking. Valid values are from 100 to 10000.

Default

Disabled

Command Mode

Interface Configuration

Command History

Release	Modification
11.3(6)NA	This command was first introduced.

Example

The following example limits overbooking on upstream port 4 to 1000%:

```
Router(config-if)# cable upstream 4 admission-control 1000
```

cable upstream channel-width

To specify an upstream channel width, use the **cable upstream channel-width** interface configuration command. Use the **no** form of this command to set the channel width to 1600000 for a port number.

> **cable upstream** *portnum* **channel-width** *width*
> **no cable upstream** *portnum* **channel-width**

Syntax Description

portnum	Specifies the port number.
width	Specifies upstream channel width in hertz (Hz). Valid values are 200000 (160000 symbols/sec), 400000 (320000 symbols/sec), 800000 (640000 symbols/sec), 1600000 (1280000 symbols/sec), and 3200000 (2560000 symbols/sec).

Default

1600000

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example configures port 2 with a channel width of 200,000 Hz (which is equivalent to a symbol rate of 160 ksym/s):

```
Router(config-if)# cable upstream 2 channel-width 200000
```

cable upstream data-backoff

To specify automatic or fixed start and stop values for data backoff, use the **cable upstream data-backoff** interface configuration command. Use the **no** form of this command to use the default data backoff values.

> **cable upstream** *portnum* **data-backoff** {**automatic** | *start end*}
> **no cable upstream** *portnum* **data-backoff**

Syntax Description

portnum	Specifies the port number.
automatic	Specifies automatic data backoff start and stop values.
start	Specifies the start value. Valid values are from 0 to 15.
end	Specifies the end value. Valid values are from 0 to 15.

Default

0 (start), 4 (end)

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

Cisco recommends that you use this automatic setting.

Example

The following example sets the automatic values for port 2:

```
Router(config-if)# cable upstream 2 data-backoff automatic
```

cable upstream minislot-size

To specify a minislot size, use the **cable upstream minislot-size** interface configuration command. Use the **no** form of this command to set the default minislot size of 8 if this is valid for the current channel width setting.

> **cable upstream** *portnum* **minislot-size** *size*
> **no cable upstream** *portnum* **minislot-size**

Syntax Description

portnum	Specifies the upstream port.
size	Specifies the minislot size in number of time ticks. Valid minislot sizes are 2 (32 symbols), 4 (64 symbols), 8 (128 symbols), 16 (256 symbols), 32 (512 symbols), 64 (1024 symbols), and 128 (2048 symbols).

Default

8

Command Mode

Interface configuration

Command History

Release	Modification
11.3(6)NA	This command was first introduced.

Usage Guidelines

Caution   Using values of 64 or 128 for higher symbol rates such as 1280 Ksymb/sec or 2560 Ksymb/sec can cause performance problems. Depending on your current setting's symbol rate, you should select the minislot size (in ticks) that yields a minislot size of 32 or 64 symbols.

Example

The following example sets the minislot size on upstream port 4 to 16 (or 256 symbols):

```
Router(config-if)# cable upstream 4 minislot-size 16
```

cable upstream modulation-profile

To assign a modulation profile to an interface, use the **cable upstream modulation-profile** interface configuration command. Use the **no** form of this command to assign modulation profile 1 to the interface.

cable upstream *portnum* **modulation-profile** *profile*
no cable upstream *portnum* **modulation-profile**

Syntax Description

portnum	Specifies the port number.
profile	Assigns the modulation profile to the specified interface.

Default

Modulation profile 1

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example assigns modulation profile 8 to port (interface) 2:

```
Router(config-if)# cable upstream 2 modulation-profile 8
```

Related Commands

Command	Description
cable modulation-profile	Defines the modulation profile.

cable upstream range-backoff

To specify automatic or configured initial ranging backoff calculation, use the **cable upstream range-backoff** interface configuration command. Use the **no** form of this command to set default values.

> **cable upstream** *portnum* **range-backoff** {**automatic** | *start end*}
> **no cable upstream** *portnum* **range-backoff**

Syntax Description

portnum	Specifies the port number.
automatic	Specifies the fixed data backoff start and end values.
start	Binary exponential algorithm. Sets the start value for data backoff. Valid values are from 0 to 15.
end	Binary exponential algorithm. Sets the end value for data backoff. Valid values are from 0 to 15.

Default

0 (start), 4 (end)

Command Mode

Interface configuration

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example sets the range backoff to automatic for port 2:

```
Router(config-if)# cable upstream 2 range-backoff automatic
```

cable upstream rate-limit

To set DOCSIS rate limiting for an upstream port on a cable modem card, use the **cable upstream rate-limit** interface configuration command. Use the **no** form of this command to disable DOCSIS rate limiting for an upstream port on a cable modem card.

cable upstream *portnum* **rate-limit** [**token-bucket**]
no cable upstream *portnum* **rate-limit**

Syntax Description

portnum	Specifies the upstream port.
token-bucket	(Optional) Applies the token bucket filter algorithm.

Default

The rate limit of the cable upstream port.

Command Mode

Interface configuration

Command History

Release	Modification
11.3(6)NA	This command was first introduced.

Usage Guidelines

Use of the default value (the upstream port's rate limit) enforces strict DOCSIS-compliant rate limiting.

Example

The following example uses the token bucket filter algorithm for upstream port 4:

```
Router(config-if)# cable upstream 4 rate-limit token-bucket
```

Related Commands

Command	Description
cable downstream rate-limit	Enables DOCSIS rate limiting on downstream traffic.

clear cable flap-list

To reset the flap-list table, use the **clear cable flap-list** privileged EXEC configuration command.

> **clear cable flap-list** [*mac-addr* | **all**]

Syntax Description

mac-addr	(Optional) MAC address. Specify the 48-bit hardware address of an individual cable modem.
all	(Optional) Remove all modems from the flap-list table.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example removes all the modems from the flap-list table:

```
Router# clear cable flap-list all
```

Related Commands

Command	Description
cable flap-list aging	Specifies when a modem's entry in the flap-list table will be deleted.
cable flap-list insertion-time	Sets the insertion time interval.
cable flap-list power-adjust threshold	Specifies the power-adjustment threshold for recording a flap-list event.
cable flap-list size	Specifies the maximum number of modems that can be reported to the flap-list table.

clear cable modem counters

To reset a cable modem's flapping counters to zero, use the **clear cable modem counters** privileged EXEC configuration command.

clear cable modem {*mac-addr* | *ip-addr* | **all**} **counters**

Syntax Description

mac-addr	MAC address. Specify the 48-bit hardware address of an individual cable modem.
ip-addr	IP address. Specify the IP address of an individual cable modem.
all	Resets the flapping data for all modems.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example clears the counters for the modem at IP address 172.00.00.00:

```
Router# clear cable modem 172.00.00.00 counters
```

Related Commands

Command	Description
clear cable modem reset	Removes the specified modem from the Station Maintenance List and resets the modem.

clear cable modem reset

To remove a modem from the Station Maintenance List and reset the modem, use the **clear cable modem reset** privileged EXEC configuration command.

clear cable modem {*mac-addr* | *ip-addr* | **all**} **reset**

Syntax Description

mac-addr	MAC address. Specify the 48-bit hardware address of an individual cable modem.
ip-addr	IP address. Specify the IP address of an individual cable modem.
all	Removes all the cable modems from the Station Maintenance List.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

This command causes the link to the modem to drop. The modem responds by resetting itself. It can take up to 30 seconds for the modem to start the reset sequence.

Example

The following example removes the cable modem at 172.00.00.00 from the Station Maintenance List:

```
Router# clear cable modem 172.00.00.00 reset
```

Related Commands

Command	Description
clear cable modem counters	Clears the flapping counters for the specified modem.

ping cable-modem

To determine whether a specific cable modem is on line, use the **ping cable-modem** privileged EXEC configuration command.

ping cable-modem *mac-addr*

Syntax Description

mac-addr	Cable modem IP address.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

This ping is a MAC layer ping that uses extra keep-alive poll messages. It also uses smaller data units than a standard IP ping, which reduces the overhead. It will work even if the IP layer in the modem is down or not fully registered.

Example

The following example confirms that the cable modem at 172.00.00.00 is connected to the network and is operational:

```
Router# ping cable-modem 172.00.00.00
172.00.00.00 is alive
```

show cable flap-list

To display the cable flap-list, use the **show cable flap-list** privileged EXEC configuration command.

> **show cable flap-list** [**sort-flap** | **sort-time**]

Syntax Description

sort-flap	(Optional) Sort by number of times the cable modem has flapped.
sort-time	(Optional) Sort most recent time the cable modem is detected to have flapped.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Sample Display

The following displays show the return for flap-list tables sorted by MAC address, by time, and by a specific upstream interface:

```
router# show cable flap-list sort-flap
Mac Address     Upstream   Ins    Hit    Miss    CRC   P-Adj   Flap    Time
.1eab.2c0b      C6/0 U0    108    318     27      0       0    108 Sep 10 15:26:56
.1eb2.bb07      C6/0 U0      0    293     31      1       1      1 Sep 10 15:15:49
.7b6b.71cd      C6/0 U0      1    288     32      0       0      1 Sep 10 15:12:13
.1eb2.bb8f      C6/0 U0      1    295     30      0       0      1 Sep 10 15:11:44
router#
Router# show cable flap-list sort-time
Mac Address     Upstream   Ins    Hit    Miss    CRC   P-Adj   Flap    Time
00e0.2222.2202 C4/0 U0    464   2069    242      0     421    885 Oct 16 22:47:23
0010.7b6b.57e1 C4/0 U0      0   2475     43      0    1041   1041 Oct 16 22:47:04
router#
router# show cable flap cable 3/0
MAC Address     Upstream    Ins    Hit    Miss CRC    P-Adj Flap   Time
0050.7366.1803  Cable3/0/U0 1787   3645   19861 0      !4    3578   Jan 17 03:28:35
0050.7366.17ab  Cable3/0/U0 1785   3718   19817 0      !3    3573   Jan 17 03:28:29
0050.7366.1801  Cable3/0/U0 1785   3628   19781 0      !3    3573   Jan 17 03:28:25
0050.7366.17d3  Cable3/0/U0 1675   3934   19492 0      !35   3385   Jan 17 03:28:37
00d0.bad3.c459  Cable3/0/U0 407    8293   3450  0      0     796    Jan 17 03:28:25
0090.8330.0214  Cable3/0/U0 174    659    2657  0      0     348    Jan 17 03:28:31
0090.8330.020f  Cable3/0/U0 173    624    2662  0      0     347    Jan 17 03:27:08
0090.8330.0213  Cable3/0/U0 173    648    2655  0      0     346    Jan 17 03:26:42
0090.8330.0211  Cable3/0/U0 173    579    2653  0      0     346    Jan 17 03:27:08
```

Table 1   show cable flap-list Field Descriptions

Field	Description
Mac Address	The customer account or street address.
Upstream	The upstream port.
Ins	The number of times the modem comes up and inserts itself into the network. This count is the number of times the RF link was reestablished more frequently than the time period configured in the **cable flap-list insertion time** command.
	It can indicate intermittent downstream sync loss or DHCP or modem registration problems.
	Each time this count increments, the flap count also increments.
Hit	The number of times the modem responds to MAC layer keep alive messages. (The minimum hit rate is once per 30 seconds. It can indicate intermittent upstream, laser clipping, or common-path distortion.
	This count should be much higher than the Miss count. If this is not the case, the modem is having trouble maintaining the link because of an upstream problem.
	The flap count increments each time the system transitions from a Hit to a Miss.
Miss	The number of times the modem misses the MAC layer keep-alive message. An 8% miss rate is normal for the MC11 card. It can indicate intermittent upstream, laser clipping, or common-path distortion.
CRC	The number of upstream Cyclic Redundancy Check errors per modem. It can indicate intermittent upstream, laser clipping, or common-path distortion.
P-Adj	The number of times the headend instructed the modem to adjust transmit (TX) power more than the threshold configured with the **cable flap-list power-adjust threshold** command.
	It can indicate amplifier degradation, poor connections, or thermal sensitivity.
	Each time this counter increments, the flap count increments.
Flap	The sum of P-Adj and Ins values. Modems with high flap counts will have high SIDs and might not register.
Time	The most recent time that the modem dropped the connection.

show cable modem

To view configuration settings on the Cisco uBR7246, use the **show cable** EXEC command.

show cable modem [*ip-address* | *mac-address*]

Syntax Description

ip-address	(Optional) Specify the IP address of the modem.
mac-address	(Optional) Specify the MAC address of the modem.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.

Usage Guidelines

This command displays information on all cable modems or a particular cable modem on the network.

Sample Display

The following are sample outputs from the **show cable modem** command:

```
router# show cable modem
Interface    SID  Online   Timing   Receive  QoS  IP address      MAC address
                  State    Offset   Power
Cable6/0/U0  1    online   3046     -2.00    4    10.30.128.35    0010.7b6b.7213
Cable6/0/U0  2    online   3047      0.00    4    10.30.128.34    0010.7bb3.fbdd
Cable6/0/U0  3    offline  3033      6.75    2    0.0.0.0         0020.4001.3e66
```

Table 2 describes the fields shown in the **show cable modem** display.

Table 2   show cable modem Field Descriptions

Field	Description
Interface	The interface on which the cable modem has an active connection and the upstream port on the interface that is being used by the cable modem.
SID	The service identifier assigned to the modem.
Online State	The status of the cable modem.

Table 2   show cable modem Field Descriptions (Continued)

Field	Description
Timing offset	The cable modem's current timing adjustment in units of the 10.24 MHz time base tick.
Receiver Power	The receive power level of the modem.
QoS	The service class assigned to the modem.
IP address	IP address of the modem.
MAC address	Media access layer address.

Related Commands

Command	Description
show cable burst-profile	Displays the upstream data burst profiles used to configure the upstream PHY.
show cable modulation-profile	Defines modulation profile group information.
cable privacy	Enables system-wide privacy.
cable qos permission	Configures permissions for updating the QoS table.
cable qos profile	Configures QoS profiles.
cable spectrum-group band	Configures a continuous band setting for a spectrum group.
cable spectrum-group frequency	Configures a spectrum group to use a specified frequency.
cable spectrum-group hop period	Configures the frequency-hop period.
cable spectrum-group hop threshold	Defines a hop threshold for the specified spectrum group.
cable spectrum-group shared	Configures upstream ports to share the same spectrum.

show cable modulation-profile

To display modulation profile group information, use the **show cable modulation-profile** privileged EXEC command.

> **show cable modulation-profile** [*profile*] [*iuc-code*]

Syntax Description

profile	(Optional) Profile number. Valid values are from 1 to 8.
iuc-code	(Optional) Internal usage code. Valid options are:

initial	Initial Ranging Burst
long	Long Grant Burst
request	Request Burst
short	Short Grant Burst
station	Station Ranging Burst

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.

Usage Guidelines

This command displays modulation profile group information. A modulation profile is a collection of six burst profiles that are sent out in an upstream channel descriptors (UCD) message to configure a modem's transmit parameters for the following upstream message types: request, initial maintenance, station maintenance, short grant, and long grant.

Sample Display

The following is sample output from the **show cable modulation-profile** command:

```
router# show cable modulation-profile 1
Mo IUC       Type  Preamb Diff FEC     FEC    Scrambl Max  Guard Last Scrambl Preamb
                   length enco T        CW     seed    B    time  CW           offset
                               bytes    size              size  size  short
1  request qpsk  64     no   0x0     0x10   0x152   1    8     no   yes     56
1  initial qpsk  128    no   0x5     0x22   0x152   0    48    no   yes     0
1  station qpsk  128    no   0x5     0x22   0x152   0    48    no   yes     0
1  short   qpsk  72     no   0x5     0x4B   0x152   0    8     no   yes     48
```

Table 3 describes the fields shown in the **show cable modulation-profile** display.

.

Table 3   show cable modulation-profile Field Descriptions

Field	Description
Mo	Modulation profile group number. A modulation profile group is the set of burst profiles that define upstream transmit characteristics for the various types of upstream transmission classes.
IUC	Interval usage code. Each upstream transmit burst belongs to a class which is given a number called the IUC. Bandwidth maps messages (MAP) by IUC codes used to allocate upstream time slots. The following types are currently defined: • Request—bandwidth request slot • Initial Maintenance—initial link registration contention slot • Station Maintenance—link keep-alive slot • Short Data Grant—short data burst slot • Long Data Grant—long data burst slot
Type	Modulation type.
Preamb length	Preamble length.
Diff enco	Differential encoding enabled (yes) or not enabled (no).
FEC T bytes	Number of bytes that can be corrected for each FEC code word.
FEC CW size	Size, in bytes, of the FEC codeword.
Scrambl seed	Scrambler seed value in hex format.
Max B size	Maximum burst size.
Guard time size	Time between successive bursts measured in symbols.
Last CW short	Handling of FEC for shortened last code word.
Scrambl	Scrambler enabled (yes) or not enabled (no).
Preamb offset	The bits to be used for the preamble value.

Related Commands

Command	Description
show cable burst-profile	Displays the upstream data burst profiles used to configure the upstream PHY.
show cable modem	Displays configuration settings for the specified cable modem.
cable privacy	Enables system-wide privacy.
cable qos permission	Configures permissions for updating the QoS table.
cable qos profile	Configures QoS profiles.
cable spectrum-group band	Configures a continuous band setting for a spectrum group.
cable spectrum-group frequency	Configures a spectrum group to use a specified frequency.
cable spectrum-group hop period	Configures the frequency-hop period.
cable spectrum-group hop threshold	Defines a hop threshold for the specified spectrum group.
cable spectrum-group shared	Configures upstream ports to share the same spectrum.

show cable qos permission

To display the status of permissions for changing QoS tables, use the **show cable qos permission** privileged EXEC configuration command.

> **cable qos permission**

Syntax Description

This command has no keywords or arguments.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Sample Displays

The following example displays the output of the **show cable qos permission** command:

```
Router# show cable qos permission

Create by SNMP  Update by SNMP  Create by modems
yes             yes             yes
```

Table 4 describes the fields shown in the **show cable qos permission** displays.

Table 4   show cable qos permission Command Field Descriptions

Field	Description
Create by SNMP	Indicates permission setting for creation of QoS table entries by Simple Network Management Protocol (SNMP).
Update by SNMP	Indicates permission setting for creation of QoS table entries by modem registration requests.
Create by modems	Indicates permission setting for dynamic updating of QoS table entries by Simple Network Management Protocol (SNMP).

Related Commands

Command	Description
cable qos permission	Configures permissions for updating the QoS table.
cable qos profile	Configures QoS profiles.
show cable qos profile	Displays QoS profiles.

show cable qos profile

To display QoS profiles, use the **show cable qos profile** privileged EXEC configuration command.

show cable qos profile *service class*

Syntax Description

service class	Displays cable QoS table.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Sample Displays

The following example displays the QoS tables for profiles 1, 2, 3, and 4:

```
Router# show cable qos profile
Service Prio Max       Guarantee Max        Max tx TOS  TOS   Create   B
class        upstream  upstream  downstream burst  mask value by       priv
             bandwidth bandwidth bandwidth                             enab
1       0    0         0         0          0      0x0  0x0   cmts     no
2       0    64000     0         1000000    0      0x0  0x0   cmts     no
3       0    1000      0         1000       0      0x0  0x0   cmts     no
4       7    2000000   100000    4000000    0      0x0  0x0   cm       yes
```

Table 5 describes the fields shown in the **show cable qos profile** displays.

Table 5   show cable qos profile Command Field Descriptions

Field	Description
Service Class	Profile number.
Prio	Priority level.
Max upstream bandwidth	Maximum upstream bandwidth.
Guarantee upstream bandwidth	Guaranteed minimum upstream bandwidth.
Max downstream bandwidth	Maximum downstream bandwidth.
Max tx burst	Maximum transmit burst size in bytes. Valid range is from 0 to the largest 16-bit integer. Default is 0.
Tos mask	Hex value of the mask bits.

Table 5   **show cable qos profile Command Field Descriptions (Continued)**

Field	Description
Tos value	Value of the mask byte.
Create by	Identity of the profile creator.
B priv enab	Reports yes if Baseline Privacy is enabled for this QoS profile. Reports no if Baseline Privacy is not enabled for this Qos profile.

Related Commands

Command	Description
cable qos permission	Configures permissions for updating the QoS table.
cable qos profile	Displays QoS profiles.
show cable qos permission	Displays the status of permissions for changing QoS tables.

show cable spectrum-group

To display information about spectrum groups, use the **show cable spectrum-group** privileged EXEC configuration command.

show cable spectrum-group [*groupnum*]

Syntax Description

groupnum	(Optional) Displays information about the specified group number. If no group number is specified, information for all spectrum groups is displayed.

Default

All spectrum groups

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.

Sample Displays

The following are sample outputs from the **show cable spectrum-group** command for the upstream spectrum group named **sales**:

```
Router# show cable spectrum-group sales
Spectrum  Frequency Band  Upstream  Time          Time          Input      Shared
  Group   (MHz)           Port      Available     Delete        PowerLevel Topology
     4    5.000-40.000                                              5          N
     4    5.000                                                     5          N
     4    5.000-40.000              Mon 12:00:00  Mon 12:00:00      5          N
     4    5.000                     Mon 12:00:00                    5          N
```

Table 6 describes the fields shown in the **show cable spectrum-group** displays.

Table 6   show cable spectrum-group Command Field Descriptions

Field	Description
Spectrum-Group	Identifies the spectrum group.
Frequency Band (MHz)	Identifies the upper and lower ranges of the frequency for this spectrum group.
Upstream Port	Identifies the upstream port number.
Time Available	Identifies the day and time of day when this group is available.
Time Delete	Identifies the day and time of day when this group will be deleted.

Table 6   **show cable spectrum-group Command Field Descriptions (Continued)**

Field	Description
Input PowerLevel	Identifies the assigned decibels per millivolt (dBmV) input level.
Shared Topology	Indicates if upstreams are physically combined (share the same combiner group). Y or yes values indicate that upstreams which are members of the spectrum group are combined and cannot be assigned overlapping frequency bands.
	N or no values indicate that upstreams which are members of the of the spectrum group are not combined and can be assigned overlapping frequency bands.

Related Commands

Command	Description
show cable burst-profile	Displays the upstream data burst profiles used to configure the upstream PHY.
show cable modem	Displays configuration settings for the specified cable modem.
show cable modulation-profile	Displays modulation profile group information.
cable privacy	Enables system-wide privacy.
cable qos permission	Configures permissions for updating the QoS table.
cable qos profile	Displays QoS profiles.

show controllers cable

To display information about a specific cable modem card slot's interface controllers, use the **show controllers cable** privileged EXEC command.

show controllers cable *slot*/*port* [**upstream**] [*port*]

Syntax Description

slot/port	Slot number/port number indicating the location of the Cisco MC11 cable modem card.
upstream	(Optional) Displays upstream interface status.
port	(Optional) Selects specific upstream port.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.
12.0(2)XC	This command was modified.

Sample Display

The following is sample output from the **show controllers cable upstream** command for the modem located in slot 4, port 0:

```
Router# show controllers cable 4/0 upstream 2
 Cable4/0 Upstream 2 is administratively down
  Frequency 5.008 MHz, Channel Width 0.200 MHz, QPSK Symbol Rate 0.160 Msps
  Spectrum Group 4
  Nominal Input Power Level 5 dBmV, Tx Timing Offset 0
  Ranging Backoff Start 16, Ranging Backoff End 16, Tx Backoff Start 16
  Tx Backoff End 16, Modulation Profile Group 1
  part_id=0x3137, rev_id=0x01, rev2_id=0xFF
  nb_agc_thr=0x0000, nb_agc_nom=0x0000
  Range Load Reg Size=0x58
  Request Load Reg Size=0x0E
  Minislot Size in number of Timebase Ticks is = 8
  Minislot Size in Symbols =8
  Bandwidth Requests = 0x0
  Piggyback Requests = 0x0
  Invalid BW Requests= 0x0
  Minislots Requested= 0x0
  Minislots Granted  = 0x0
  Minislot Size in Bytes = 2
  UCD Count = 0
```

```
DES Ctrl Reg#0 = C00C0C43, Reg#1 = 0
```

Table 7 describes the fields shown in the **show controllers cable upstream** display.

Table 7   show controllers cable upstream Command Field Descriptions

Field	Description
Cable	Slot number/port number indicating the location of the Cisco MC11 cable modem card.
Upstream is administratively down	Indicates the RF upstream interface is disabled.
Frequency	Transmission frequency of the RF upstream channel.
Channel Width	Indicates the width of the RF upstream channel.
QPSK Symbol Rate	Indicates the modulation technique for upstream transmission.
Spectrum Group 4	Indicates the spectrum group associated with this slot and port.
Nominal Input Power level	Indicates the desired power level coming into the receiver.
Tx Timing Offset	Indicates the current ranging offset on the channel.
Ranging Backoff Start	Indicates how many ranging slots to backoff before resending the ranging bursts after an upstream collision. Expressed as exponents of 2. See Ranging Backoff End.
Ranging Backoff End	Indicates how many ranging slots to backoff before resending the ranging bursts after an upstream collision. Expressed as exponents of 2. See Ranging Backoff Start.
Tx Backoff Start	Indicates the starting exponential backoff value for data collisions.
Tx Backoff End	Indicates the ending exponential backoff value for data collisions.
Modulation Profile Group	A set of burst profiles defining an upstream range.
part_id=	The part number of the Phy chip.
rev_id=	The Phy chip revision number.
rev2_id=	The Phy chip sub-revision number.
nb_agc_thr=	Threshold used to control gain.
nb_agc_nom=	Used to accelerate convergence of input power level.
Range Load Reg Size=	Size, indicated by number of symbols, for range request bursts.
Request Load Reg Size=	Size, indicated by number of symbols, for request bursts.
Minislot Size in number of Timebase Ticks is	Size in tick units of upstream minislot. A tick is 6.25 microseconds.
Minislot Size in Symbols	Size in symbols of the upstream minislot.
Bandwidth Requests	Number of successful bandwidth requests received in the contention minislots.
Piggyback Requests	Number of successful bandwidth requests piggybacked with regular data transmissions.
Invalid BW Requests	Number of invalid bandwidth (BW) requests. (An example of an invalid bandwidth request is a modem using a non-existent SID to request bandwidth.
Minislots Requested	Total number of minislots requested.
Minislots Granted	Total number of minislots granted.
Minislot Size in Bytes	Size in bytes of the minislot.
UCD Count	Number of UCDs sent for this upstream.

Table 7   show controllers cable upstream Command Field Descriptions (Continued)

Field	Description
DES Ctrl Reg # =	Interval DES controller register dump.

Related Commands

Command	Description
show controllers cable	Displays interface controllers information about the specified cable modem card slot.

show interface cable

To display cable interface information, use the **show interface cable** privileged EXEC command.

show interface cable *slot/port* [**downstream | upstream**]

Syntax Description

slot/port	Identifies the Cisco uBR7200 chassis slot number and downstream port number. Valid values are from 3 to 6.
downstream	(Optional) Displays cable downstream port information for a cable modem.
upstream	(Optional) Displays cable upstream port information for a cable modem.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.

Sample Display

The following is sample output for the cable modem located in slot 6/port 0 from the **show interface cable** command:

```
router# show interface cable 6/0
Cable6/0 is up, line protocol is up
  Hardware is BCM3210 FPGA, address is 00e0.1e5f.7a60 (bia 00e0.1e5f.7a60)
  Internet address is 1.1.1.3/24
  MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation, loopback not set, keepalive not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 4d07h, output 00:00:00, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     10908 packets input, 855000 bytes, 0 no buffer
     Received 3699 broadcasts, 0 runts, 0 giants, 0 throttles
     3 input errors, 3 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     5412 packets output, 646488 bytes, 0 underruns
     0 output errors, 0 collisions, 13082 interface resets
  0 output buffer failures, 0 output buffers swapped out
```

Table 8 describes the fields shown in the **show interface cable** display.

Table 8   show interface cable Command Field Descriptions

Field	Description
Cable slot/port is up/...administratively down	Indicates whether the interface hardware is currently active or taken down by the administrator.
line protocol is up/...administratively down	Indicates whether the software processes that handle the line protocol believe the interface is usable or if it has been taken down by the administrator.
hardware	Hardware type and address.
Internet address	Internet address followed by subnet mask.
MTU	Maximum Transmission Unit (MTU) of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is 100% reliability.)
load	Load on the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is complete saturation.)
Encapsulation	Encapsulation method assigned to this interface.
ARP type	Type of Address Resolution Protocol (ARP) and timeout value assigned.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
Last clearing of "show interface" counters	Time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) were last reset to zero.
Queueing strategy	Displays the type of queueing configured for this interface. In the following example output, the type of queueing configured is First In First Out (FIFO).
Output queue	Number of packets in the output queue. The format of this number is A/B, where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.
drops	Indicates the number of packets dropped due to a full queue.
input queue/drops	Number of packets in the input queue. The format of this number is A/B, where A indicates the number of packets in the queue, and B indicates the maximum number of packets allowed in the queue.
drops	Indicates the number of packets dropped due to a full queue.
Five minute input rate Five minute output rate	Average number of bits and packets transmitted per second in the last five minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.

Table 8　　　　**show interface cable Command Field Descriptions (Continued)**

Field	Description
no buffer	Number of received packets discarded because there was no buffer space in the main system.
Received broadcast	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Includes runts, giants, no buffers, CRC, frame, overrun, and ignored counts.
CRC	Indicates the number of times the cyclic redundancy checksum generated by the originating LAN station or far-end device does not match the checksum calculated from the data received.
frame	Number of packets received incorrectly having a CRC error and a non-integer number of octets.
overrun	Number of times the receiver hardware was unable to forward received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times the transmitter has been running faster than the receiving device can handle.
output errors	Sum of all errors that prevented the final transmission of packets out of the interface being examined.
collisions	Not applicable to the Cisco uBR7246.
interface resets	Number of times an interface has been completely reset.
output buffer failures	Number of times the output buffer has failed.
output buffer swapped out	Number of times the output buffer has been swapped out.

The following is sample output for the downstream cable interface of slot 6 on port 0 from the **show interface cable downstream** command:

```
router# show interface cable 6/0 downstream
Cable6/0: Downstream is up
     111947771 packets output, 1579682655 bytes, 0 discarded
     0 output errors
```

Table 9 describes the fields shown in the **show interface cable downstream** display.

Table 9　　　　**show interface cable downstream Command Field Descriptions**

Field	Description
Cable	Indicates the location of the downstream interface.

Table 9   show interface cable downstream Command Field Descriptions (Continued)

Field	Description
Downstream is up/...administratively down	Indicates the administrative state of the interface.
packets output	Total number of packets transmitted out of this interface.
bytes	Total number of bytes transmitted out of this interface.
discarded	Total number of packets discarded.
output errors	Sum of all errors that prevented downstream transmission of packets out of this interface.

The following is sample output for the upstream cable interface located in slot 6/port 0 from the **show interface cable upstream** command:

```
router# show interface cable 6/0 upstream
Cable6/0: Upstream 0 is up
   Received 3699 broadcasts, 0 multicasts, 28586 unicasts
   0 discards, 0 errors, 0 unknown protocol
   21817 packets input, 0 corrected, 0 uncorrectable
   0 noise, 0 microreflections
   Guaranteed-rate service queue depth:0
   Best-effort service queue depth:0
   Total Modems On This Upstream Channel:3 (3 active)
   Current Total Bandwidth Reserved:192000 bps
   Current Admission Control Status: ENFORCED
   Percentage of Oversubscription: 200%
   Reservation Limit (with Oversubscription):5120000 bps
   Last Minislot Stamp (current_time_base):190026    FLAG:1
   Last Minislot Stamp (scheduler_time_base):200706  FLAG:1
```

Table 10 describes the fields shown in the **show interface cable upstream** display.

Table 10   show interface cable upstream Command Field Descriptions

Field	Description
Cable	Indicates the location of the upstream interface.
Upstream is up/...administratively down	Indicates the administrative state of the upstream interface.
Received broadcasts	Number of broadcast packets received through this upstream interface.
multicasts	Number of multicast packets received through this upstream interface.
unicasts	Number of unicast packets received through this interface.
discards	Number of packets discarded by this interface.
errors	Sum of all errors that prevented upstream transmission of packets through this interface.
unknown protocol	Number of packets received that were generated using a protocol unknown to the Cisco uBR7246.
packets input	Number of packets received through this upstream interface that were free from errors.

Table 10   **show interface cable upstream Command Field Descriptions (Continued)**

Field	Description
corrected	Number of error packets received through this upstream interface that were corrected.
uncorrectable	Number of error packets received through this upstream interface that could not be corrected.
noise	Number of upstream packets corrupted by line noise.
microreflections	Number of upstream packets corrupted by microreflections.
Guaranteed-rate service queue depth	Number of bandwidth requests queued up in the Guarantee-rate queue. This queue is only available to modems that have a reserved minimum upstream rate in their Class of Service.
Best-effort service queue depth	Number of bandwidth requests queued up in the Best-effort queue. This queue is available to all modems that do not have any reserved rate on the upstream.
Total Modems On This Upstream Channel	Number of cable modems currently sharing this upstream channel. This field also shows how many of these modems are active.
Current Total Bandwidth Reserved	Total amount of bandwidth reserved by all modems sharing this upstream channel that require bandwidth reservation. The Class of Service for these modems specifies some non-zero value for the guaranteed-upstream rate. When one of these modems is admitted on the upstream, this field value is incremented by this guaranteed-upstream rate value.
Current Admission Control Status	Indicates the status of admission control on the upstream channel.
	ENFORCED status allows users to enable admission control on a per port basis. This controls how limited bandwidth is allocated. NOT ENFORCED status indicates that there is no admission control. Every modem that registers with a class of service specifying a minimum upstream rate will be admitted by the CMTS regardless of how much aggregate bandwidth is actually available.
	Users enable admission control via the admission control CLI.
Percentage of Oversubscription	Amount of oversubscription to allow on this upstream channel. Oversubscription is expressed as a percentage of the raw capacity of the channel. In the example shown, an oversubscription rate of 200% on a 2.56 Mbps channel allows the cumulative bandwidth reservation on this channel to reach 5.12 Mbps before modems configured with non-zero reserved upstream rates are denied service.
Reservation Limit (with Oversubscription)	Maximum cumulative bandwidth reservation allowable before rejecting new modems. In the example shown, this reservation limit with oversubscription is 5.12 Mbps.
Last Minislot Stamp (current_time_base)	Indicates the current minislot count at the CMTS. FLAG indicates the timebase reference. This field is used only by developers.
Last Minislot Stamp (scheduler_time_base)	Indicates the furthest minislot count allocated at the indicated time. FLAG indicates the timebase reference. This field is used by developers.

Related Commands

Command	Description
show interface cable sid	Displays the service identifier information for each cable modem on the network.
show interface cable signal-quality	Displays signal quality information for the specified slot.

show interface cable sid

To display information by service identifier (SID) of each cable modem on the network, use the **show interface sid** privileged EXEC command.

>**show interfaces cable** *slot/port* **sid** [*sid-number*]

Syntax Description

slot/port	Identifies the Cisco uBR7200 chassis slot number and downstream port number. Valid values are from 3 to 6.
sid-number	(Optional) Identifies the service identification number.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.

Usage Guidelines

Data transport over the RF link uses the registered SID address rather than the Ethernet address. This allows multiple hosts to access the network via a single cable modem.

Sample Display

The following are sample outputs from two uses of the **show interface cable sid** command:

```
router# show interface cable 6/0 sid
SID  Status  QoS Creattime  Inoctets    Inpackets   IP address    MAC address
1    enable  2   57         80139964    101336      1.1.1.5       00e0.1eab.2c0b
2    enable  2   57         49132       649         1.1.1.7       00e0.1eb2.bb07
3    enable  2   58         80042891    100555      1.1.1.2       00e0.1eab.2c29

router# show interface cable 6/0 sid 1
SID  Status  QoS Creattime  Inoctets    Inpackets   IP address    MAC address
1    enable  2   57         80140204    101340      1.1.1.5       00e0.1eab.2c0b
```

If the value for the QoS group in the display appears as 0, it indicates that a temporary SID has been assigned to a cable modem that is in the process of connecting to the network:

```
router# show interface cable 6/0 sid
SID  Status  QoS Creattime  Inoctets    Inpackets   IP address    MAC address
1    enable  0   57         80140204    101340      1.1.1.5       00e0.1eab.2c0b
```

If there are no cable modems connected to the cable interface you have selected, the display will appear as follows:

```
router# show interface cable 6/0 sid
SID  Status  QoS Creattime  Inoctets   Inpackets  IP address    MAC address
1       Not in use
```

Note Use the **show cable qos** command to examine the actual quality of service parameters assigned to the QoS group numbers.

Table 11 describes the fields shown in the output for the **show interface cable sid** displays.

Table 11   **show interface cable sid Command Field Descriptions**

Field	Description
SID	Service identification number.
Status	"Disable" means that the SID has been administratively disabled. "Enable" is the normal state.
QoS	Quality of service.
Creattime	When the SID was created, number of seconds since system booted.
Inoctets	Number of octets received using this SID.
Inpackets	Number of packets received using this SID.
IP address	IP address of the modem owning this SID.
MAC address	MAC address of the modem owning this SID.

Related Commands

Command	Description
show interface cable signal-quality	Displays signal quality information for the specified slot.

show interface cable signal-quality

To display information about the signal quality, use the **show interface cable signal-quality** privileged EXEC command.

> **show interface cable** *slot/port* **signal-quality**

Syntax Description

slot/port	Identifies the Cisco uBR7200 chassis slot number and downstream port number. Valid values are from 3 to 6.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 XA	This command was first introduced.

Sample Display

The following is sample output from the **show interface signal quality** command:

```
router# show interface cable 6/0 signal-quality
Cable6/0: Upstream 0 is up includes contention intervals: TRUE
```

Table 12 describes the fields shown in the **show controllers cable upstream** display.

Table 12   show interface cable signal quality Command Field Descriptions

Field	Description
Cable	Interface name.
Upstream is up includes contention intervals	States whether this statement is true.

Related Commands

Command	Description
show interface	Displays information for all configured interfaces for the specified slot.
show interface cable	Displays cable interface information for the specified slot.
show interface cable sid	Displays the service identifier information for each cable modem on the network.

test cable atp cable

To run the acceptance test procedure on a port, use the **test cable atp cable** privileged EXEC configuration command.

> **test cable atp cable** *slot/port MAC-address category test-id*

Syntax Description

slot/port	Specifies upstream cable interface by slot and port number.
MAC-address	Specifies the MAC address of the cable modem.
category	Specifies the test category as being *mac* for MAC tests or *mp* for MAC-PHY tests. Valid MAC tests are 1 through 15. Valid MAC-PHY tests are 4 through 7. These categories of tests are described in the ATP documentation.
test-id	Identifies a test specified in the automatic test procedure (ATP) documentation. The ATP documentation describes the collection of tests and the categories into which these tests are divided.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3(6)NA	This command was first introduced.

Usage Guidelines

You should read and understand the ATP documentation before using this command.

The ATP tests are organized into categories such as PHY, MP, MAC, and so forth. Tests within each category are labeled MP01, MP02, ..., MAC01, MAC02, and so forth. If you run a test from the CLI, you can omit the leading zero in the test ID.

In this release, Cisco supports only a subset of all of the tests.

Examples

The following example tests the upstream cable interface located in slot 2/port 0 at MAC address 1.1.1. The test specified is MAC-PHY test 4 (MP-04).

```
Router# test cable atp cable 2/0 1.1.1 mp 4
Running Upstream Channel Change (MP-04)
Testing MP_04_UCD_FREQ_CHANGE
Setting the upstream to 30MHz through UCD.
```

```
    Waiting 30 seconds for new frequency to be effective.
    05:18:46: %UBR7200-5-USFREQCHG: Interface Cable2/0 Port U-1, frequency changed to
    30.000 MHz
    Conducting connectivity test.
```

Some tests, such as the one shown below, produce volumious output:

```
Router#test cable atp c6/0 0010.7b43.aab9 8
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 8/8/8 ms
*** 1-1. Normal TLV order UCD test started.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/26/100 ms
*** 1-1. Normal TLV order UCD test passed.
Continue to next step?[confirm]
*** 1-2. Reversed TLV order UCD test started.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
!!!!!
...
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/27/104 ms
*** 2-6. negative burst descriptor(type 129, len 1; in Request msg) test passed.

Continue to next step?[confirm]
*** 2-7. undefined burst descriptor(type 12; in Short Data msg) test started.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/26/100 ms
*** 2-7. undefined burst descriptor(type 12; in Short Data msg) test passed.
Continue to next step?[confirm]
*** 2-8. Null burst descriptor(len 0, type 12; in Short Data msg) test started.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/27/104 ms
*** 2-8. Null burst descriptor(len 0, type 12; in Short Data msg) test passed.
Continue to next step?[confirm]
*** 2-9. negative burst descriptor(type 129, len 1; in Short Data msg) test
started.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/26/100 ms
*** 2-9. negative burst descriptor(type 129, len 1; in Short Data msg) test
passed.
Continue to next step?[confirm]
*** 3-1. Number of burst profiles test(#burst desc.in UCD > # burst profiles in
MAP) started.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
!!!!!
...
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/26/100 ms
*** 4-1. Long Grant without max. burst size test(Short Grant size=1) passed.
Continue to next step?[confirm]
*** 5-6. UCD count less than MAP change count test started.
 UCD count:19, next MAP change count:20
 Station maintenance req failed
 UCD count:19, next MAP change count restored:19
```

```
*** 5-6. UCD count less than MAP change count test passed.
Continue to next step?[confirm]
*** 5-7. Stopping UCD test started.
CM T1 timeout and reset (y/n)?[confirm]
 wait for CM to come up again.
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 19.1.25.195, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 8/34/112 ms
*** 5-7. Stopping UCD test passed.
Continue to next step?[confirm]
...
```

Debug Commands

The following **debug cable** commands have been added to or modified in this release of the Cisco uBR7246 and are available to help you troubleshoot the cable interfaces:

- **debug cable mac**
- **debug cable map**

For information on other **debug cable** commands, refer to the *Voice, Video, and Home Applications Configuration Guide*.

debug cable mac

Use the **debug cable mac** EXEC command to display MAC-layer information for the specified cable modem. The **no** form of this command disables debugging output.

debug cable mac
no debug cable mac

Syntax Description

This command has no keywords or arguments.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Usage Guidelines

Note   Do not use this command if you have a large number of modems on your network. The Cisco uBR7246 will become flooded with console printouts.

Example

The following example shows the return for the MAC layer:

```
router# debug cable mac

19:46:27: Ranging Modem with Sid 1 on i/f : Cable6/0/U0

19:46:27: Got a ranging request
19:46:27: SID value is 1 on Interface Cable6/0/U0
19:46:27: CM mac address 00:E0:1E:B2:BB:07
19:46:27: Timing offset is 0
19:46:27: Power value is FE0, or 0 dB
19:46:27: Freq Error = 0, Freq offset is 0
19:46:27: Ranging has been successful for SID 1 on Interface Cable6/0/U0

19:46:29: Ranging Modem with Sid 2 on i/f : Cable6/0/U0
19:46:29: Got a ranging request
19:46:29: SID value is 2 on Interface Cable6/0/U0
19:46:29: CM mac address 00:E0:1E:B2:BB:8F
19:46:29: Timing offset is 1
19:46:29: Power value is 1350, or 0 dB
19:46:29: Freq Error = 0, Freq offset is 0
19:46:29: Ranging has been successful for SID 2 on Interface Cable6/0/U0
```

```
19:46:32: Ranging Modem with Sid 3 on i/f : Cable6/0/U0

19:46:32: Got a ranging request
19:46:32: SID value is 3 on Interface Cable6/0/U0
19:46:32: CM mac address 00:E0:1E:B2:BB:B1
19:46:32: Timing offset is FFFFFFFF
19:46:32: Power value is 1890, or -1 dB
19:46:32: Freq Error = 0, Freq offset is 0
19:46:32: Ranging has been successful for SID 3 on Interface Cable6/0/U0

19:46:34: Ranging Modem with Sid 5 on i/f : Cable6/0/U0
```

Table 13   debug cable mac Command Field Descriptions

Field	Description
SID value is....	Reports the service ID of the modem. The range is from 1 through 891. The information on this line should agree with the first line of the return (that is, Ranging Modem with Sid...).
CM mac address....	The MAC address of the specified cable modem.
Timing offset is....	The time by which to offset the frame transmission upstream so the frame arrives at the expected minislot time at the CMTS.
Power value is FE0, or 0 dB	The raw value derived from the 3137 Broadcom chip. Alternately, the dB value specifies the relative change in the transmission power level that the cable modem needs to make so transmissions arrive at the CMTS at the desired power level. This desired power level is usually 0, but you can use the CLI to change it via the **cable power-level** command.
Freq Error = ...	The raw value derived from the 3137 Broadcom chip.
Freq offset is	Specifies the relative change in the transmission frequency that the cable modem will make to match the CMTS.

Related Commands

Command	Description
show controllers cable	Displays interface controller information for the specified slot.

debug cable map

Use the **debug cable map** EXEC command to display map debugging messages. The **no** form of this command disables debugging output.

debug cable map
no debug cable map

Syntax Description

This command has no keywords or arguments.

Default

No default behavior or values.

Command Mode

Privileged EXEC

Command History

Release	Modification
11.3 NA	This command was first introduced.

Example

The following example displays all the MAP messages with and without data grants:

```
router# debug cable map

19:41:53: On interface Cable6/0, sent 5000 MAPs, 1321 MAPs had grant(s)Long Grants
13256993, Total Short Grants 223
A sample Map without any data grant
----------------- MAP MSG  --------------------
us_ch_id: 1   ucd_count: 5  num_elems: 9  reserved: 0
Alloc Start Time: 33792       Ack Time: 33618
Rng_bkoff_start: 0    Rng_bkoff_end: 2
Data_bkoff_start: 1   Data_bkoff_end: 3:
sid:16383   iuc:1   mslot_offset:0
sid:0   iuc:7   mslot_offset:40
A sample Map with data grant(s)
----------------- MAP MSG  --------------------
us_ch_id: 1   ucd_count: 5  num_elems: 7  reserved: 0
Alloc Start Time: 33712       Ack Time: 33578
Rng_bkoff_start: 0    Rng_bkoff_end: 2
Data_bkoff_start: 1   Data_bkoff_end: 3
sid:2   iuc:6   mslot_offset:0
sid:16383   iuc:1   mslot_offset:16
sid:0   iuc:7   mslot_offset:40
```

Table 14   debug cable map Command Field Descriptions

Field	Description
sent 5000 MAPs	Total number of maps transmitted.

Table 14   debug cable map Command Field Descriptions (Continued)

Field	Description
MAPs had grant(s) Long Grants	Total number of grants considered long sized by CMTS.
Total Short Grants	Total number of grants considered short sized by CMTS.
us_ch_id	Identifies the upstream channel ID for this message.
ucd_count	Number of upstream channel descriptors (UCDs).
num_elems	Number of information elements in the map.
reserved	Reserved for alignment.
Alloc Start Time	Start time from CMTS initialization (in minislots) for assignments in this map.
Ack Time	Latest time from CMTS initialization (in minislots) processed in upstream. The cable modems use this time for collision detection.
Rng_bkoff_start	Initial backoff window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.
Rng_bkoff_end	Final backoff window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.
Data_bkoff_start	Initial backoff window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.
Data_bkoff_end	Final backoff window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.
sid	Service ID.
iuc	Interval usage code (IUC) value.
mslot_offset	Minislot offset.

Related Commands

Command	Description
show controllers cable	Displays interface controller information for the specified slot.

What to Do Next

For more information on the Cisco uBR7246, refer to the *Voice, Video, and Home Applications Configuration Guide*.

For instructions on the advanced configuration of the port adapters installed in your Cisco uBR7246, refer to the respective installation documents that shipped with each port adapter. This documentation is also available on the Cisco Documentation CD-ROM and on Cisco Connection Online (CCO).

For instructions on the advanced configuration of the cable modem cards, refer to the document *Cisco uBR7246 Universal Broadband Router Cable Modem Card Installation and Configuration* This document accompanies every Cisco cable modem card that is shipped from the factory as an installed item in a Cisco uBR7246 or as a field replaceable unit (FRU). The document is also available on the Cisco Documentation CD-ROM and on CCO.